

7. (Twice Amended) A semiconductor device, comprising:  
an n-channel metal-oxide-semiconductor field-effect transistor; and  
a p-channel metal-oxide-semiconductor field-effect transistor,  
at least one of the n-channel metal-oxide-semiconductor field-effect transistor  
and the p-channel metal-oxide-semiconductor field-effect transistor including:  
a gate insulation film and a gate electrode on the gate insulation film,  
the gate electrode including a germanium film on the gate insulation film, wherein p-type  
impurities are doped into said germanium film.

Please add new claim 17 as follows:

--17. A semiconductor device according to claim 1, wherein a range of  
concentration of the p-type impurities is  $10^{17}$  to  $10^{20}$  cm<sup>-3</sup>.--

REMARKS

Claims 1, 2 and 4-17 are pending. By this Amendment, claim 3 is cancelled without  
prejudice or disclaimer, claims 1 and 7 are amended, and claim 17 is added. Claims 8-13  
have previously been withdrawn from consideration. Reconsideration based on the above-  
amendments and following remarks is respectfully requested.

The attached Appendix includes marked-up copies of each rewritten claim (37 C.F.R.  
§1.121(c)(1)(ii)).

Entry of the amendments is proper under 37 CFR §1.116 since the amendments: (a)  
place the application in condition for allowance (for the reasons discussed herein); (b) do not  
raise any new issue requiring further search and/or consideration (since the amendments  
amplify issues previously discussed throughout prosecution); (c) satisfy a requirement of  
form asserted in the previous Office Action; (d) do not present any additional claims without  
canceling a corresponding number of finally rejected claims; and (e) place the application in  
better form for appeal, should an appeal be necessary. The amendments are necessary and

were not earlier presented because e.g. they are made in response to arguments raised in the final rejection. Entry of the amendments is thus respectfully requested.

I. The Claims Define Allowable Subject Matter

The Office Action rejects claims 1, 2, 7, 15 and 16 under 35 U.S.C. §102(e) as unpatentable over U.S. Patent No. 5,801,444 to Aboelfotoh et al.; claims 3, 4 and 14 under 35 U.S.C. §103(a) as unpatentable over Aboelfotoh in view of U.S. Patent No. 5,216,271 to Takagi et al. and U.S. Patent No. 6,124,614 to Ryum et al.; claim 5 under 35 U.S.C. §103(a) as unpatentable over Aboelfotoh in view of Takagi and Ryum and in further view of U.S. Patent No. 5,608,249 to Gonzalez; and claim 6 under 35 U.S.C. §103(a) as unpatentable over Aboelfotoh in view of Takagi and Ryum and in further view of U.S. Patent No. 5,227,333 to Shepard. These rejections are respectfully traversed.

With respect to independent claims 1 and 7, none of the applied art discloses a semiconductor device including a "gate electrode including a germanium film on the gate insulation film, wherein p-type impurities are doped into said germanium film," as recited in claims 1 and 7.

Instead, the gate electrode of Aboelfotoh is made from Cu<sub>3</sub>Ge as shown in Fig. 37 of Aboelfotoh. Clearly, the gate electrode of Aboelfotoh is not made from germanium film into which p-type impurities are doped. Similarly, Ryum does not disclose this type of impurities.

The claimed invention includes a gate electrode which is formed on the gate insulation film and is made from germanium film into which p-type impurities are doped. Therefore, it is possible to bring the work function of a gate electrode close to an intrinsic mid gap energy of silicon. Thus, higher concentration of impurities doped into the channel can be reduced, thereby enabling the prevention of deterioration of the carrier mobility in the channel.

The rejections under 35 U.S.C. §§102 and 103 should be withdrawn because the applied art, whether taken singly or combined, does not teach or suggest each feature of independent claims 1 and 7. As pointed out in MPEP §2131, "[t]o anticipate a claim, the reference must teach every element of the claim." Thus, "[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a prior art reference. *Verdegaal Bros. v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987)." Similarly, MPEP §2143.03 instructs that "[t]o establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 409 F.2d 981, 180 USPQ 580 (CCPA 1974)."

For at least these reasons, it is respectfully submitted that independent claims 1 and 7 are distinguishable over the applied art. The remainder of the claims that depend from independent claims 1 and 7 are likewise distinguishable over the applied art for at least the reasons discussed above, as well as for the additional features they recite.

II. Conclusion

In view of the foregoing, Applicants respectfully request entry of this Amendment to place the application in clear condition for allowance.

Should the Examiner believe that anything further would be desirable in order to place this application in better condition for allowance, the Examiner is invited to contact Applicants' undersigned representative at the telephone number listed below.

Respectfully submitted,



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Attachments:

Appendix

Petition for Extension of Time

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